TOSHIBA

FILE No. 210 - 200107

SERVICE MANUAL

DIGITAL STILL CAMERA

PDR-M25

PDR-M25

CREATED IN JAPAN, Nov., 2001

TOSHIBA PDR-M25

Service Manual

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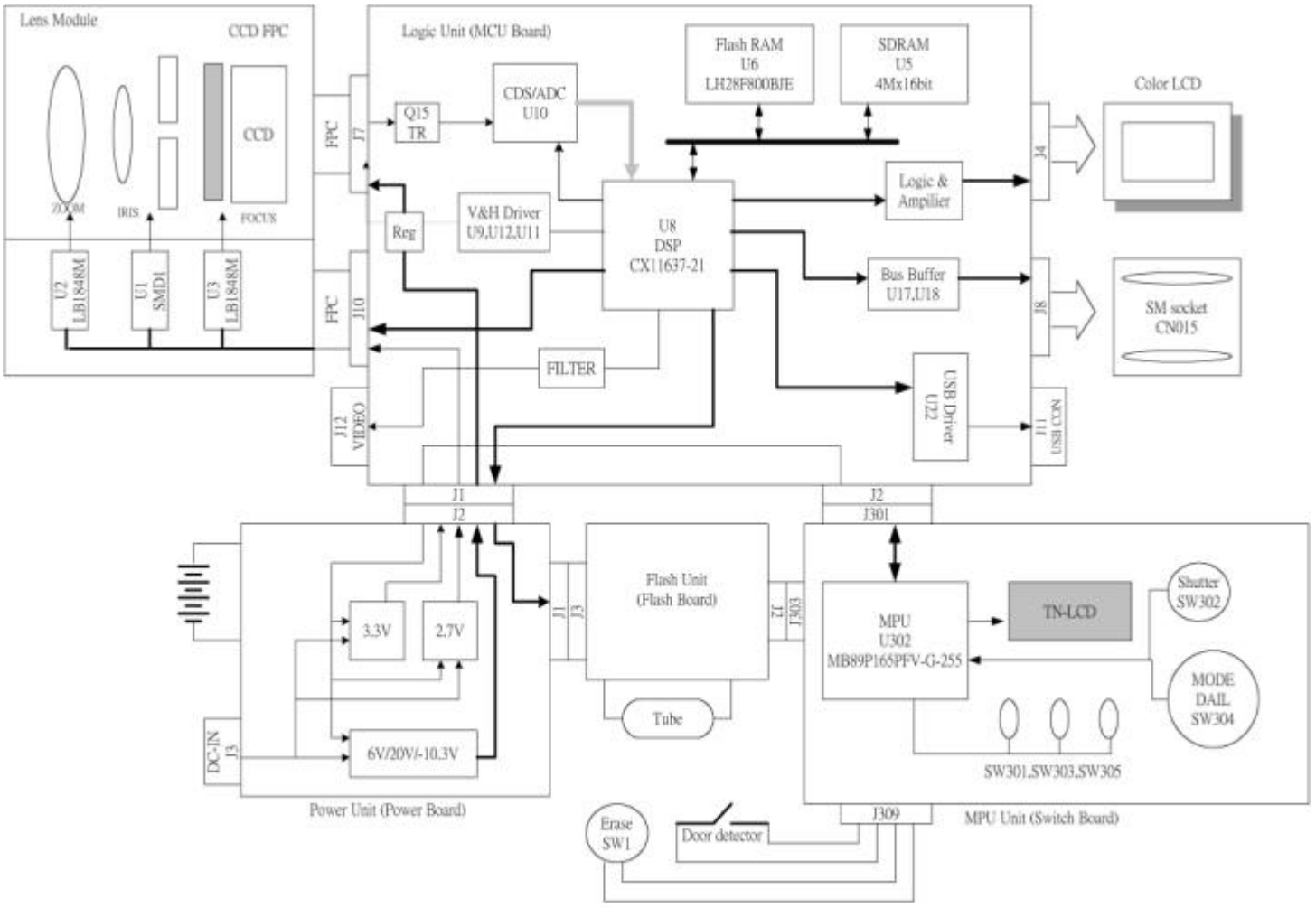
Updated : Dec. 08 2001

Prepared by Premier Image Technology Corp.

Section 1. System Overview



PDR-M25 System Diagram

1-1 System Overview

It consists of 4 PC boards, lens module, color LCD and Smart Media Connector etc.

Microprocessor unit detects the power management and key operation and functions as a slave microprocessor of DSP(Raptor) in the Logic unit. Logic unit covers all function of signal processing and camera functions.

1-2 Boot up Sequence

The voltage of 3.3V_UC is supplied by a battery insertion or DC input. The microprocessor (U302) is reset and starts the boot-up operation of DSP (logic board - U8). Also, the microprocessor performs the boot-up operation of DSP when detecting DC JACK of battery insertion/extraction. The boot-up procedures are as follows:

1.The microprocessor asserts the POWER_ENb signal (switch board - U302 pin34) to LOW and turns the power on.

2.The microprocessor(switch board - U302) sends a reset signal to the microprocessor DSP (U8) and checks whether the status signal from UIO_SDATA is returned. When the normal signal does not return, the reset signal is sent again. The microprocessor starts Key scan. DSP starts to perform the designated processes after receiving the mode information from the microprocessor.

1-3 OFF Mode

When Pin26 (SW board - J301)POWER_SW signal (SW board-U302,Pin24) of the ON/OFF switch (Logic board - J1,Sw2) asserts signal to high, the microprocessor enters OFF mode.

In this case, the microprocessor turns all the power off and performs Key scan by every 250 ms. After 10 seconds of entering the OFF mode, the microprocessor enters the power saving mode (Deep sleep mode) and all functions except for the Timer are set to OFF. When sliding the POWER knob to turn on the power again, the microprocessor restarts.

1-4 Image Capturing

The CCD driving signal (TG) is generated by the programmable timing generator (PTG)in DSP(Logic board -U8), which is converted into appropriate voltage to drive the CCD through buffers(U17,U18). The output from the lens module enters the logic board through connector J10. The OS output is A/D-converted in CDS through TR(Q15) and then entered DSP(U8). The color separation is carried out inside the DSP and the processed signal(data)is stored inside the SDRAM(U5) .

1-5 LCD

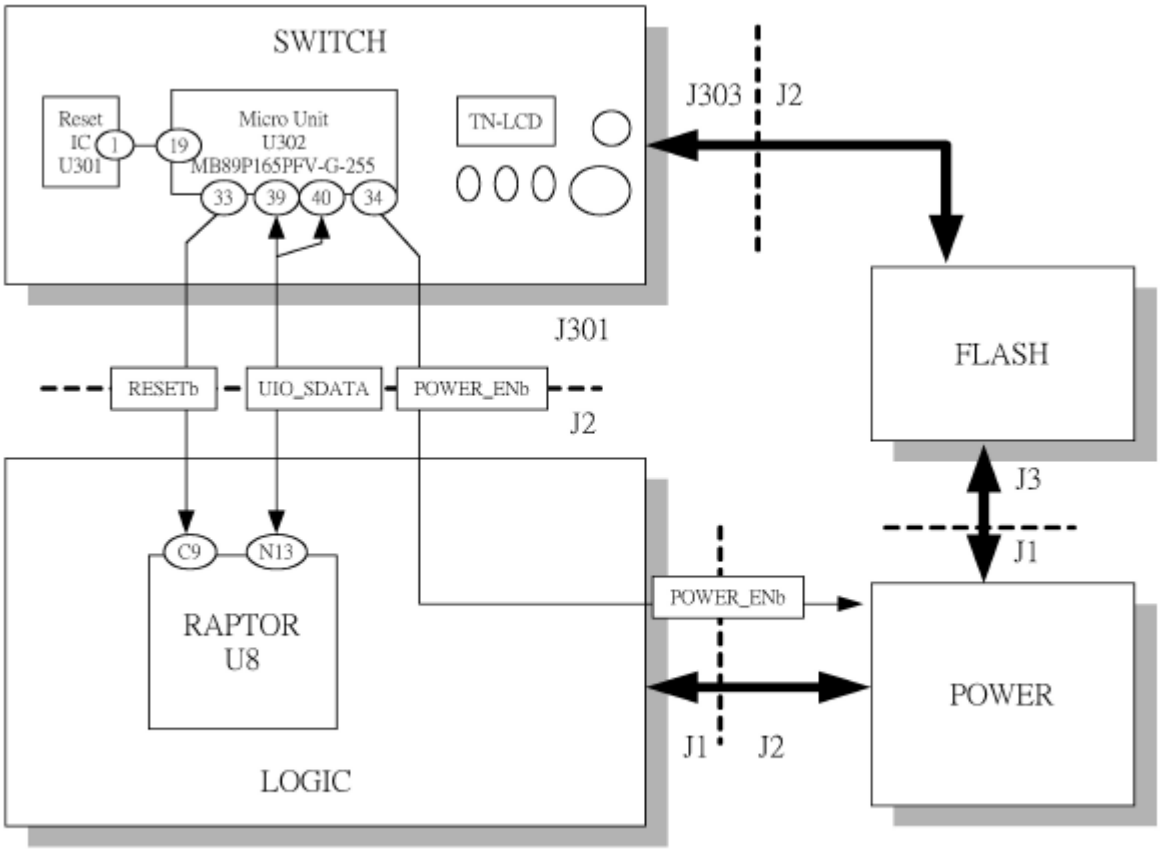
After the images stored on the SDRAM(logic board - U5) are processed inside DSP (U8) again, they are modified to the appropriate size, bit width(6bit per each RGB) and sent to the LCD driver with the driving signal required.

1-6 Monitor Out

In the same way as described in the LCD section after the images are modified to the appropriate size, the Video player(VP)inside U8 develops a signal modulated to NTSC and PAL format by DA output(pin K14) of U8.The image signal passes through the 75ohm driver circuit inside the logic unit and develops from the connector(J12)

1-7 Lens Control

The lens module controls the step motor control signal(Logic board - J10)input for Zoom, Focus and Iris & shutter, the focus position switch output(J10,pin1)for the focus position detection and the potentiometer output(J10,pin4)for the zoom position detection Each motor control signal is converted to 2-sphase excitation signal in the motor driver by using the PWM output (J10, pin14, pin15)of DSP and sent to the motor.



PDR-M25 Boards Connection Diagram

1-8 AF & AE

The captured images are processed by shifting the iris and focus position inside DSP(U8)to obtain the best iris & focus position. Only when using a half-shutter function, AE&AF operation is carried out.

1-9 Zoom

Zoom key -> detection of potentiometer alignment by a sub-microprocessor -> Raptor PWM output -> Control by a motor. The fine adjustment of focus is carried out by every position at Zoom.

1-10 Card Access

The data stored on a SDRAM(logic board – U5) is compressed inside DSP(U8) and recorded in a SM card . The Gate (logic board - U17,U18) is inserted to protect for a damage by insertion /extraction of a card. The gate is forcedly opened /closed by a card detection signal (logic board , J8 pin12)of socket the presence or absence of the card is detected according to the detection of the door opened/closed signal .

1-11 Strobe Control

Strobe charge is controlled by a sub microprocessor (switch board, U302) and the light emission is controlled by DSP (U8) corresponding to the CCD output amount. The sub microprocessor detects a charge voltage by turning STROBE_V(switch board ,

J303,pin4) and controls to keep 300V by turning CHARGEb(J303,pin3)ON/OFF. Light emission amount is controlled by ON time of FLH_TRIG signal (U8,pin c15)Furthermore, in the sub microprocessor the STROBE_ENb signal (J303, pin6) prohibits the strobe from working necessarily.

1-12 Power Supply

The power supply is controlled by the sub microprocessor.

1. Power supply controlled by POWER_Enb

   Power supply for Lens module

   Power supply for Logic unit

   Power supply for Flash unit

2. Power supply controlled by BKLT_PWMb

   Power supply for LCD backlight

3. Power ON

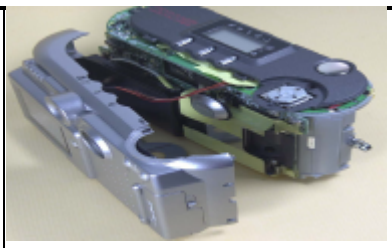
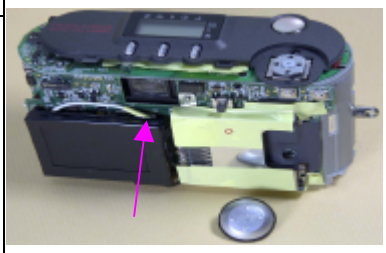
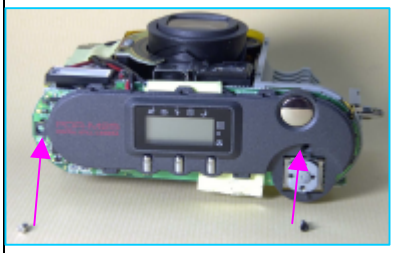
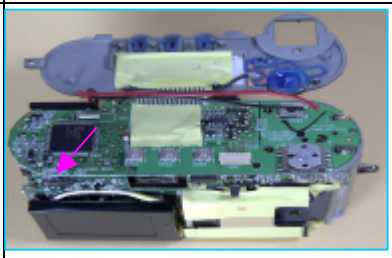
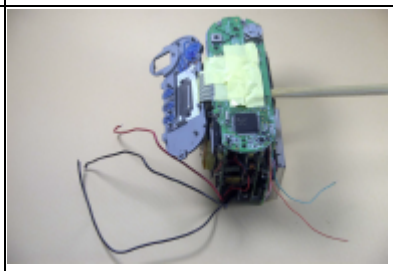
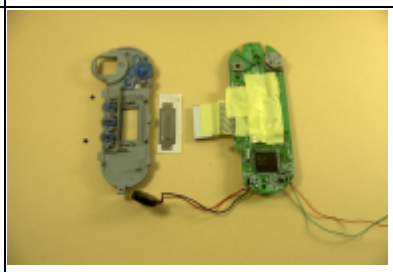
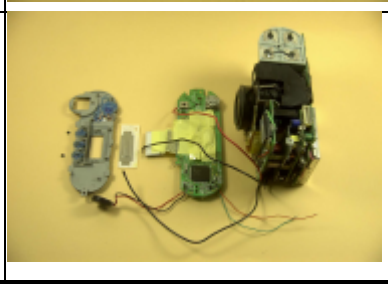
   Power supply for backup: 3.3V_UC

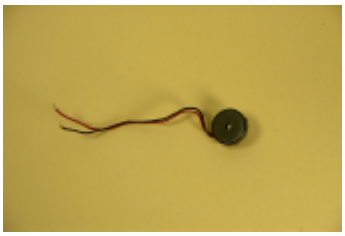
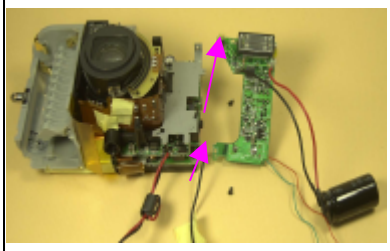
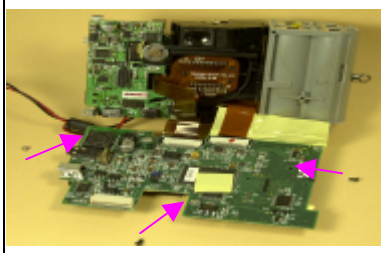
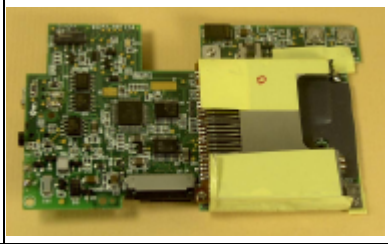
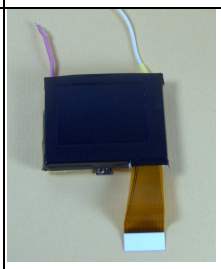
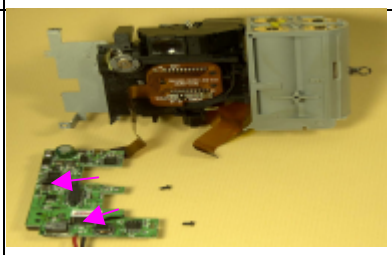
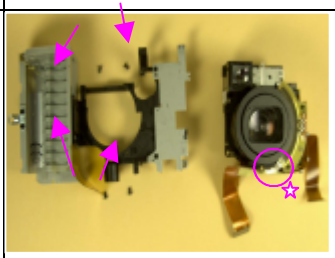
1-13 Alignment data

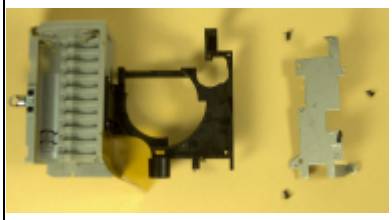
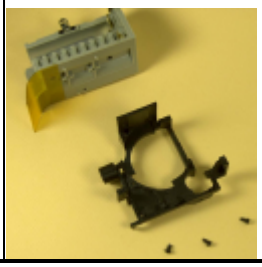
The alignment data for CCD and strobe is written at the top block of FlashRAM(logic board ,U6)

Section 2-1. Disassembly

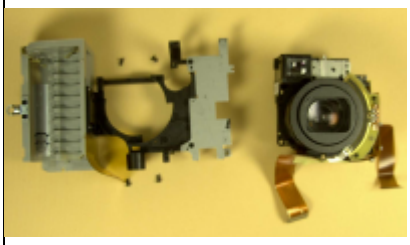
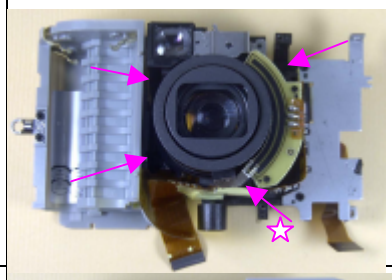
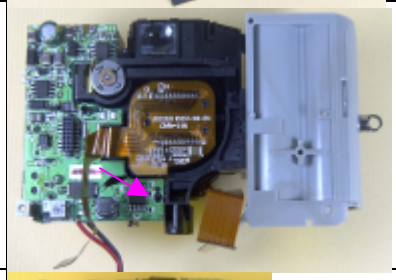
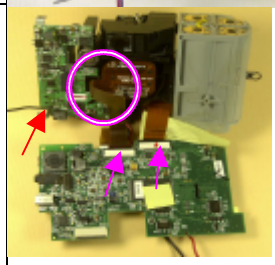
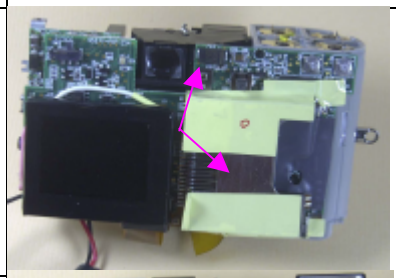
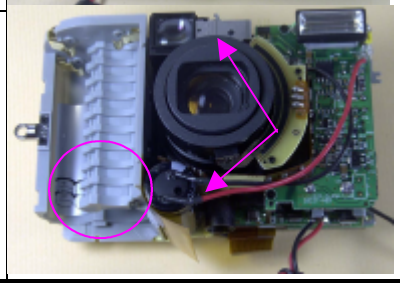
Step	Figure	Description	Remark	Tools
1		Finished Product	● Examine if there's any scratch on the surface.	
2		Stick the mode knob cap (93134-034) by acrylic bar and pull up the cap.	● Check if the stickiness of acrylic bar is strong enough to remove the cap or not.	Acrylic bar
3		Remove the screws 01635-117*2 and 95234-008 of mode knob to detach the knob from the camera		Screw driver
4		Remove all the screws of 01635-018*6 & 01635-290*1 at the camera housing.	● Do not scratch the camera surface while removing the screws.	Screw driver
5		Detach the front cover 95234-420 from camera then discharge the Flash PCB.	● Discharge the FLASH PCB	

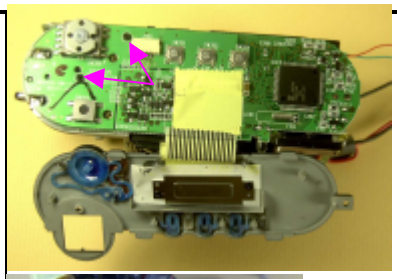
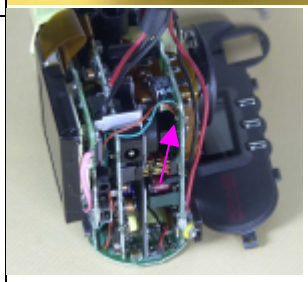
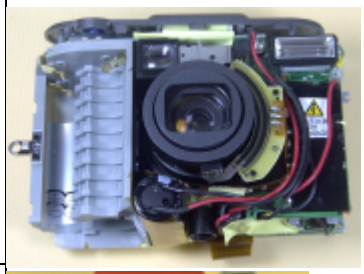
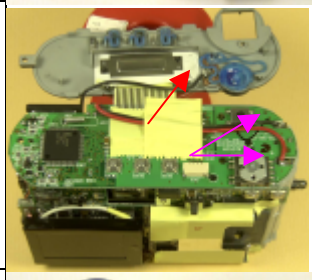
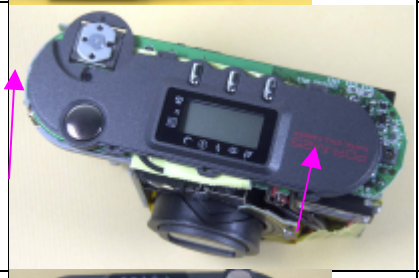
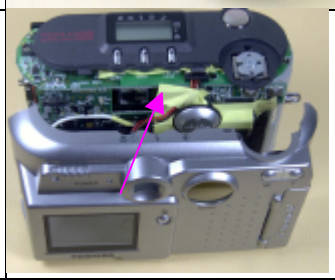
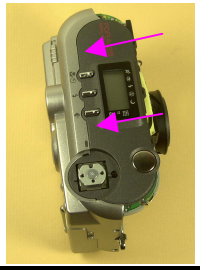
6		Remove the rear cover 95234-440 from camera then disconnect the connectors from SW PCB	● Be careful not to damage the wires while disassembly.	
7		Remove the 5-way button 95234-007		
8		Remove the screws 01635-179 & 01635-286 from top cover 95234-400		Screw driver
9		Remove the power wires from the soldered joints by soldering iron	● Be careful not to burn the surrounding components	Soldering iron
10		Remove the screws 01635-177*2 on SW to detach it from camera.		Soldering iron, Screw driver, Fixture
11		Remove the screws 01635-164*2 of TN-LCD frame 95235-004 to detach it		Screw driver
12		Finish Top cover disassembly.		

13		Remove the soldered joints by soldering iron for Buzzer.		Soldering Iron
14		Remove the screw of FLASH PCB 95247-4100 to take off the FLASH PCB		Screw Driver
15		Remove the screw 01635-287 of MCU PCB 95247-0100 to take off the MCU PCB		Screw Driver
16		Detach the LCD from MCU PCB and remove the soldered joints		Screw Driver, Soldering Iron
17		LCD Detached.		
18		Remove the screws 01635-177*2 of POWER PC B95247-8100 to take off the POWER PCB		Screw Driver
19		Remove the four screws 01635-177*4 on lens to separate the lens from the core	Do not touch the blades while removing the screws from the lens at the star marked..	Screw Driver

20		Detach the Lens holder from Bracket by removing screws 01635-177*2.01635-176*1		Screw driver
21		Detach the lens holder from battery holder by removing screws 01635-041*3		Screw driver

Section 2-2. Assembly

Step	Figure	Description	Remark	Tools
1		Install the lens to the holder		
2		Drive screws 01635-177*4 to fix the lens set on core	● Do not touch the blades while removing the screws from the lens at the star marked..	Screw driver
3		Drive screws 01635-177*2 to fix POWER PCB		Screw driver
4		Insert the lens FPC cable into the MCU connector to assemble the MCU PCB (solder the black wire as the ESD solution)	● Watch out the direction of FPC cable. ● The cable should be bent as shown. ● Make sure the connections of POWER & MCU SW are correct.	
5		Drive screws 01635-177*2 & 01635-287 to fix MCU PCB		Screw driver
6		Drive screws 01635-177*2 of FLASH PCB	● The big capacitor should be positioned in the circle as shown	Screw driver

7		Install TN-LCD on top cover, drive the screws 01635-177*2 to fix the SW	● Examine the connections between SW and FLASH&MCU are correct.	Screw driver
8		Solder the wires	● SW & FLASH, the green wire is positive, the orange wire is negative.	Soldering Iron, Tweezers
9		Make up the wires	● The wires cannot be mixed together	Tweezers
10		Solder the wires & arrange the wires		Soldering Iron, Tweezers
11		Drive the screws 01635-286 & 01635-179	● Do not squeeze the wires by PCB.	Screw driver
12		Arrange the wires	● The four wires should be parallel arranged.	Tweezers
13		Rear cover assembly	● Confirm the kinks are at the right positions and tight fixed.	

14		Front cover assembly		
14		Screw up 01635-018*6 & 01635-290*1		Screw driver
15		Screw up 01635-117*2 of mode knob 95234-008		Screw driver
16		Install the mode knob cap (finished)		

Sec. 3 Calibration

3-1 Equipments

1) Light Box:

DNP Standard Color Viewer
Model: Model -V
Use Lamp: FL-10W
Voltage: 100V

2) Vector Scope

3) Focus Test Charts

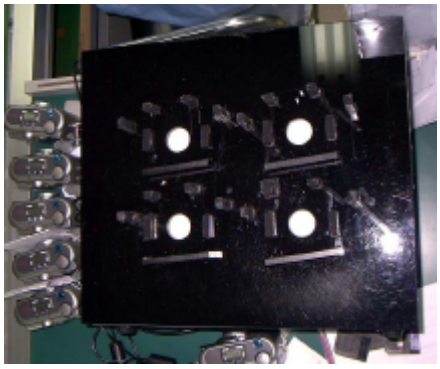
Near Focus : Supplied as PDF file. File Name nearchart.pdf
Far Focus : Supplied as PDF file. File Name farchart.pdf

4) Power Supply: AC Adapter

AC adapter or DC power supply set to 5.0V

5) Positioning fixture

3-2 CCD Calibration



Tools:

AC Adapter
DNP Light Box: color temp 5100 ±200k; brightness 4000 ± 400Lux
Camera Positioning Fixture
SM Card with Calibration Code

Procedure:

1. Install the SM card with CCD calibration code into camera.
2. Place the camera into the positioning fixture. The calibration distance between camera lens and the surface of DNP light box should be less than 1 cm.
3. Attach camera to power supply. TFT LCD displays "COMTOOL COMMAND MENU"
4. Select item 1 named CCD calibration using Zoom key (T/W).
5. Press shutter to run calibration test. It spends for almost 120 seconds.
6. If TFT LCD displays OK after calibration, camera is successfully calibrated. If TFT LCD displays error code, camera fails.

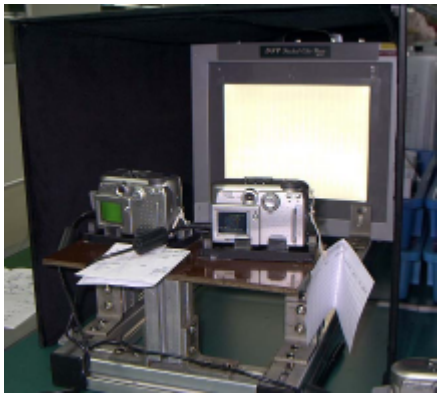
3-3 Near Focus Verification

Tools:

AC Adapter
DNP Light Box: color temp 5100 ±200k; brightness 4000 ±400Lux
Camera Positioning Fixture
SM Card with Calibration Code
40 cm Focus Target -attached to Light Box
TV cable, TV set

Procedure:

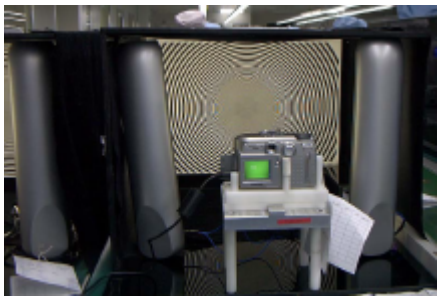
1. Install the SM card with calibration code into camera.
2. Place camera into the positioning fixture. The calibration distance between camera lens and the surface of DNP light box should be 40 ±1 cm and should be at the middle position.
3. Attach camera to power supply and TV cable.
4. Turn on the camera. TV displays “COMTOOL COMMAND MENU”
5. Select Item 2 by using Zoom key (T/W)
6. Press shutter to run Near focus calibration.
7. If TV displays “OK” after calibration, camera is successfully calibrated. If TV displays error code, camera fails.



3-4 Far Focus Verification

Tools:
Far Focus Chart
AC Adapter
SM Card with Calibration Code
Camera Positioning Fixture
45 cm Focus Target - attached to Light Box
TV cable, TV set

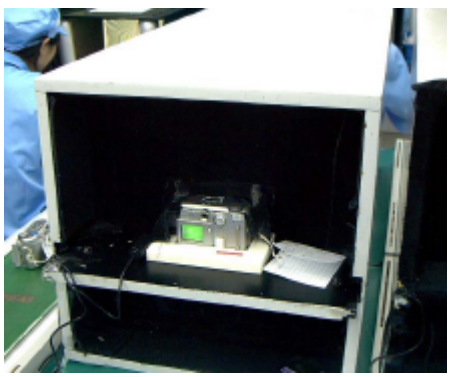
Procedure:
1. Install the SM card with calibration code into camera.
2. Place camera into the positioning fixture. The calibration distance between camera lens and the target chart should be 45 ±1 cm and should be at the middle position.
3. Attach camera to power supply and TV cable.
4. Turn on the camera. TV displays “COMTOOL COMMAND MENU”
5. Select Item 3 by using Zoom key (T/W).
6. Press shutter to run far focus calibration.
7. If TV displays “OK FOCUS OK” after calibration, camera is successfully calibrated. If TV displays error code, camera fails.



3-5 Strobe Check

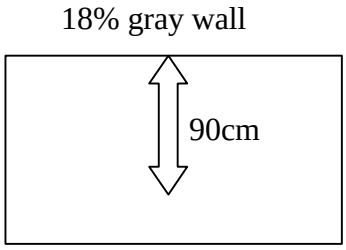
Tools:
Black Box: D90cm * W40cm * H40cm
AC Adapter
SM Card with Calibration Code
Positioning Fixture
90 cm 18% gray chart - attached to Black Box
TV cable, TV set

Procedure:
1. Install the SM card with calibration code into camera.
2. Place camera into the positioning fixture. The calibration distance between camera lens and the black box should be 90 ±1 cm and should be at the middle position.



3. Attach camera to AC adapter and TV cable.
4. Turn on the camera. TV displays “COMTOOL COMMAND MENU”
5. Select Item 5 by using Zoom key (T/W).
6. Press shutter to run Strobe calibration.
7. If TV displays “STROBE CAL COMPLETE” after calibration, camera is successfully calibrated. If TV displays error code, camera fails

.



3-6 Video Signal / Calibration (NTSC and PAL) Test

Tools:
AC Adapter
SM Card with Calibration Code
Vector Scope
TV cable, NTSC TV set

Procedure:
1. Install the SM card with calibration code into camera.
2. Attach camera to TV cable. Attach the other terminal into the left-hand upper side hole of CH1 of Vector Scope’s back.
3. Attach cable into the left-hand lower side hole of CH1 of Vector Scope’s back. Attach the other terminal to TV set.
4. Attach camera to AC adapter.
5. Power on the camera. TV displays “COMTOOL COMMAND MENU”
6. Select Item 6 by using Zoom key.
7. Press shutter button. Then TV displays color bars.
8. Press T/W buttons to adjust the position of six points into the center of frame on Vector Scope.
9. Press shutter, TV displays “OK” to show camera is successfully calibrated.

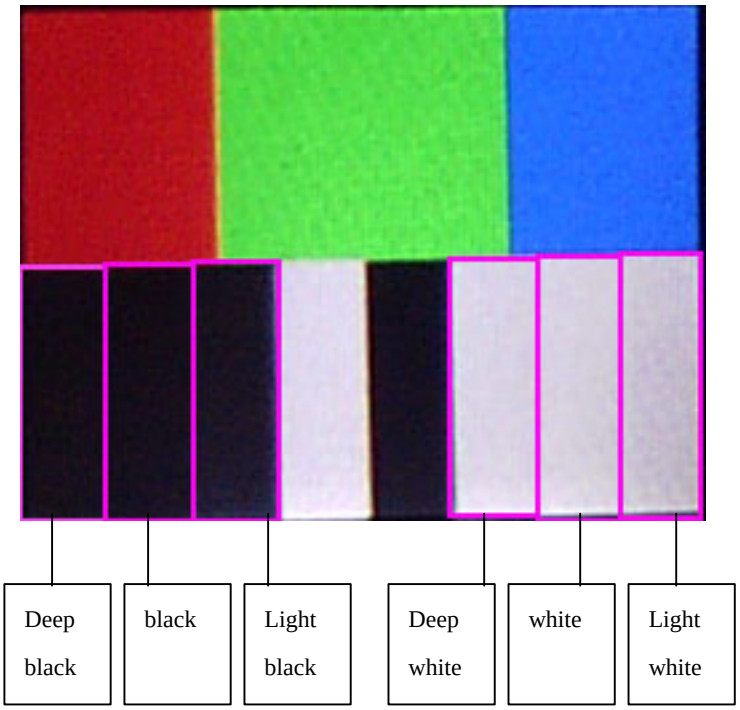
3-7 LCD Calibration Test

Tools:
AC Adapter
SM Card with Calibration Code
Positioning Fixture

Procedure:
1. Install the SM card with calibration code into camera.
2. Attach camera to AC adapter and TV cable.
3. Power on the camera. TV displays “COMTOOL

COMMAND MENU”

4. Select Item 7 by using zoom key (T/W).
5. Press shutter once. B/W LCD displays “505”
6. Use zoom key T(white) and W(black) buttons to adjust the gray level .
7. Press shutter to confirm the adjustment.



Appendix :

CAMTOOL Command Menu

Strobe Check Box Specifications

Entrance: Covered with Black Felt Curtains

Dimensions: WxHxD=1 m x 1 m x 1 m or Gray chart as WxH: 1 m x 1 m

Material: .75 inch thick Cabinet Grade Plywood

Paint: Paint Interior Surface with Flat Black Paint

18 % Gray Rear Target: Fits Tightly to Rear Inside Dimension of Box. 18% Gray Target Material (Card Stock) can be purchased for Kodak among other standard Vendors.

3-8 Firmware Updates Procedures

To update the camera firmware, you will need to have

1. The new firmware file from Premier
2. One Smart media card
3. One card reader.

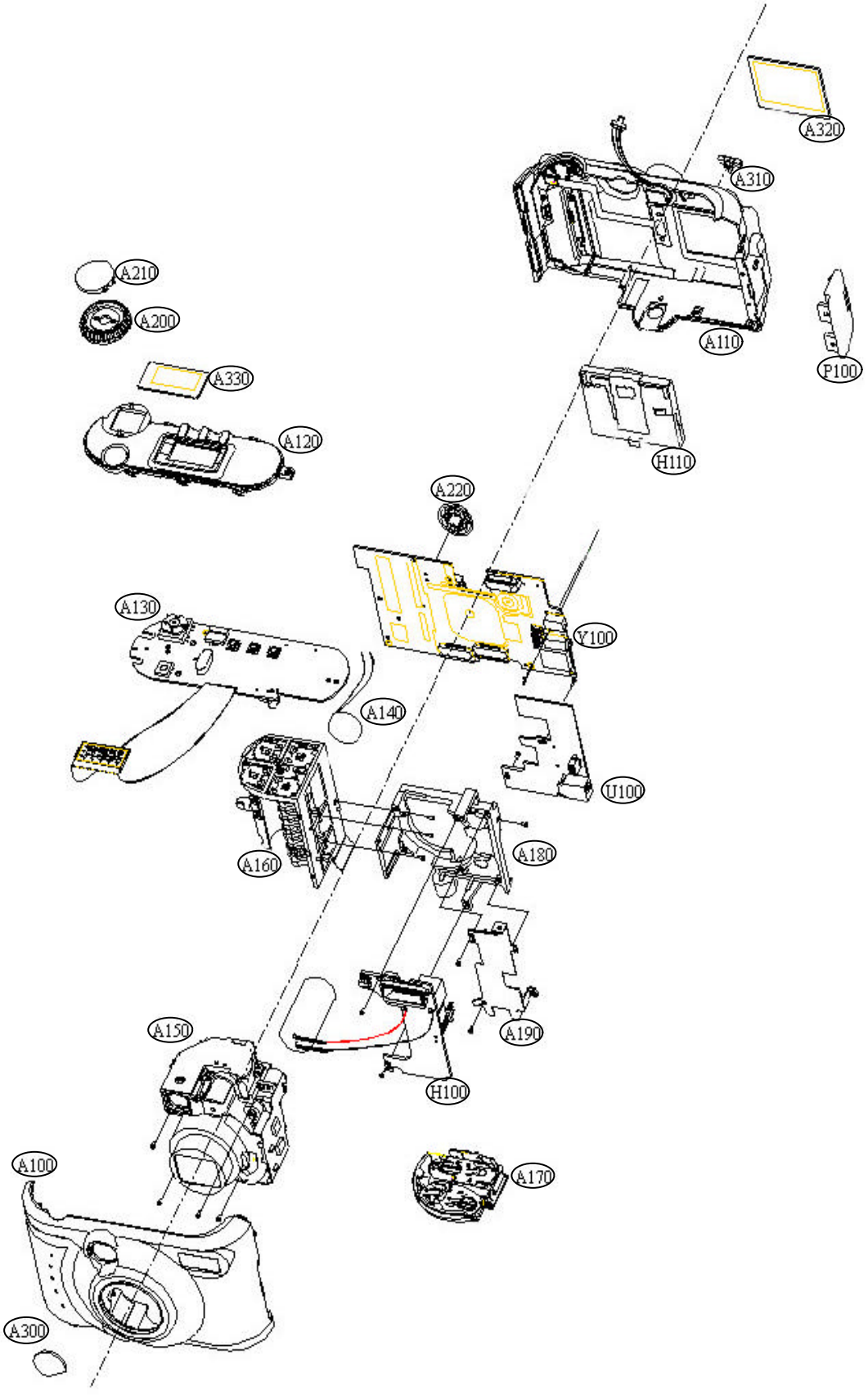
Please follow the steps below to perform the update process.

1. Prepare a Smart media card, delete all the files in it.
2. Insert a Smart media card to the Card Reader
3. Copy the firmware files to the Smart media card only into the root directory
4. Insert the Smart media card to the camera
5. Attach the AC adapter to the camera.
6. Power on the camera. You will hear five beeps. During the time of five beeps, press the shutter button to start the updating process.
7. After completing the firmware update, you will hear five beeps again. (Caution : Don’t power off the camera or do any actions to the camera. Power interruption will damage the camera.)
8. The camera will turn on for initialization and then off automatically. Now, the camera is successfully updated.

Sec. 4 Troubleshooting

Item	Status	How to fix	Board
1	LCD only displays backlight.	1. Check L18	Main
		2. Q16,20,21,22 short	Main
		3. Main board U3 error	Main
2	F/W can't turn on the power.	Update the F/W	Main
3	F/W can't update F/W.	1. Check door switch.	
		2. Check D311 on switch board.	Switch
4	“Beeps" alerts as turning on the power.	1. Shutter button press the shutter key,	Switch
		2. Check if the camera correctly assembled.	
5	Lens doesn’t zoom smoothly.	1. Lens broken	Main
		2. ASIC damage	Main
6	LCD always displays blue screen.	R19,R26 error	Main
7	Can't turn on the power.	1. Check the input voltage is 5V,2A	
	(If no power input)	2. Check power board Fuse1	Power
		3. Check SW board +3.3V_UC	Power
8	Can't turn on the power or low current.	Flash Ram broken	Main
9	Video doesn’t work.	video jack broken	Main
10	TN-LCD don’t display or words missing	1. TN-LCD broken	Switch
		2. U302 broken	Switch
11	Flash can't fire!	1. Check flash board C27	Flash
		2. Check IGBT Q8	Flash
		3. Check Q10	Flash

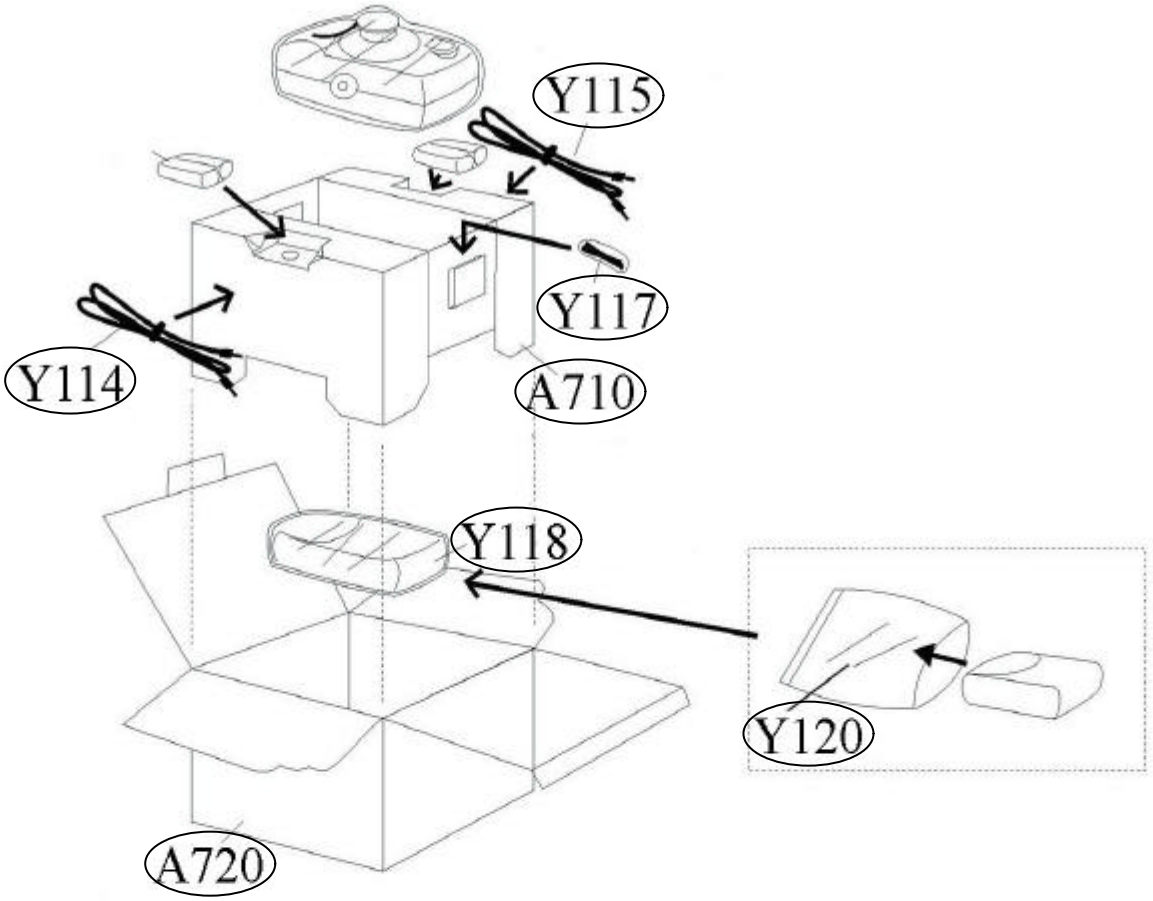
Sec. 5-1 Explode Diagram

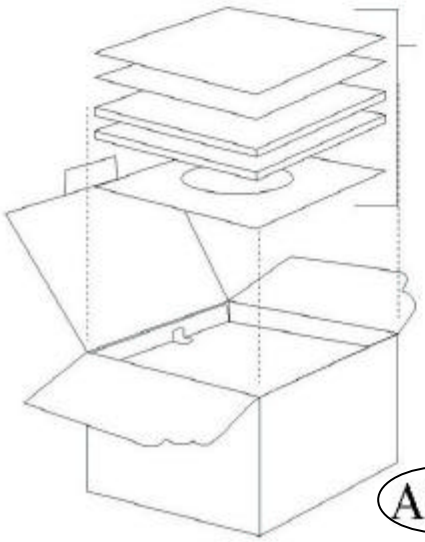


Sec. 5-2 Screw List

	Part Name	Position Used	Specification	Qty
1	01635-003	Battery Holder	S:1.7*4*C0.8 BL	2
2	01635-025	Flash tube mask	S:2*3*A1 BL	2
3	01635-041	Battery holder &lens holder	S:2*3.5*A1 BL	3
4	01635-057	Strap attachment	S:1.7*2.6*C0.8 BL/H	2
5	01635-061	Battery cover	S:1.4*2*A0.5 BL	5
6	01635-117	Mode switch	S:M1.7*2*A0.5 NI	2
7	01635-124B	Battery holder & contacts	S:1.7*3*E0.5 BL	4
8	01635-164	TN-LCD frame	S:1.4*1.5*A0.4 BL/H	2
9	01635-176	Bracket (Core)	S:1.7*2.5*A0.5 BL	1
10	01635-177	SW PCB	S:1.7*3*A0.5 BL/H	2
11	01635-177	Bracket (Core)	S:1.7*3*A0.5 BL/H	3
12	01635-177	Lens & Lens holder	S:1.7*3*A0.5 BL/H	4
13	01635-177	POWER PCB	S:1.7*3*A0.5 BL/H	2
14	01635-177	MCU PCB	S:1.7*3*A0.5 BL/H	2
15	01635-177	FLASH PCB	S:1.7*3*A0.5 BL/H	2
16	01635-179	Top cover	S:1.7*5*A0.5 BL	1
17	01635-179	Battery Chamber	S:1.7*5*A0.5 BL	1
18	01635-287	MCU PCB fix	S:M2*2*A0.5 NI	1
19	01635-287	LCD frame	S:M2*2*A0.5 NI	2
20	01635-287	Memory card ASSY	S:M2*2*A0.5 NI	3
21	01635-290A	Front cover / Rear cover ASSY	S:2*5*A1 NI	1
22	01635-311A	Memory card slot cover	S:1.4*3*C0.5 BL	1
23	01635-312	Power Switch	S:1.2*2.5*C0.5 BL	1
24	01635-318	Top cover	S:M2*3.5*C0.5,NI	1
25	01635-339	Front cover / Rear cover ASSY	S:2*3*A0.8 NI HK*-	6

Sec. 6-1 Packing Explode Diagram





Y121 Warranty
Y122 Registration Card
Y123 Notice
Y111 CD-ROM
Y112 S/F Manual
Y113 Instruction Manual

A700

Sec. 6-2 Part List for Packing Accessory

Part Code	Parts Name	Description	Model	Pcs/Set	Premier P/N	TOSHIBA P/N
Quick change Parts						
A300	View Finder cover	VF COVER	A/E/J	1	95234-021	72001530
A310	Power switch	POWER SW	A/E/J	1	95234-016-3BZ	72001531
A320	TFT panel cover	TFT P COVER	A/E/J	1	95234-014	72001532
A330	B/W LCD panel cover	BW LCD COVER 25	A/E/J	1	95234-015	72001533
Mechanical Parts						
A100	Front cover ASSY	FRONT COVER	A/E/J	1	95244-2000	72001534
A110	Rear cover ASSY	REAR COVER	A/E/J	1	95284-0001	72001535
A120	Top cover ASSY	TOP COVER	A/E/J	1	95244-0000	72001536
A130	Switch board ASSY	SWITCH BOARD	A/E/J	1	95247-3100	72001537
A140	Buzzer	BUZZER	A/E/J	1	02437-A08	72001538
A150	Lens Module,CCD and VF ASSY	LENS BLOCK	A/E/J	1	95246-0000-2BP	72001539
A160	Battery holder ASSY	BATT HOLDER	A/E/J	1	95284-0006	72001540
A170	Battery cover ASSY	BATT COVER	A/E/J	1	95244-7100	72001541
A180	Lens holder	LENS HOLDER	A/E/J	1	95234-011*00	72001542
A190	Bracket(PCB holder)	BRACKET	A/E/J	1	95235-008	72001543
H100	Flash PCB ASSY	STROBE	A/E/J	1	95284-0002	72001544
H110	LCD Module ASSY	COLOR LCD	A/E/J	1	95284-0003	72001545
Y100	MSU+SM card	SMARTMEDIA	A/E/J	1	95284-0000	72001566
U100	Power PCB ASSY	POWER PCB	A/E/J	1	95247-8100	72001546
P100	Connector Jack	JACK	A/E/J	1	95234-013*2BT	72001547
A200	Mode Knob	MODE KNOB	A/E/J	1	95234-008-2BP	72001548
A210	Mode Cap	MODE CAP	A/E/J	1	93134-034	72001549
A220	5-way button	5WAY BUTTON	A/E/J	1	95284-0004	72001550
Packing Assembly						
A700	M25 Packing Parts	PACKING UE	A/E	1	95284-0008	72001552
Y111	CD-ROM	CD-ROM	A/E/J	1	95239-A00C-TOS	72001553
Y112	Software manual	MANUAL SOFT	A/E	1	95239-401A-TOS	72001554
Y113	Instruction Manual	MANUAL	A/E	1	95239-400A-TOS	72001555
Y114	Video Cable	VIDEO CABLE	A/E/J	1	02547-0028	72001565
Y115	USB cable	USB CABLE	A/E/J	1	02547-B043	72001556
Y116	Lens Strap, Lens cap	LENS CAP	A/E/J	1	95238-001	72001557
Y117	Hand strap	HAND STRAP	A/E/J	1	95238-000	72001558
Y118	Pouch	POUCH	A/E/J	1	95239-300-TOS	72001559
Y119	HD PE bag	HD PE BAG	A/E/J	1	04039-023-1	72001560
Y120	PE bag	PE BAG	A/E/J	1	04039-045	72001561
A710	Partition	PARTITION	A/E/J	1	95239-690A	72001562
A720	Gift Box	GIFT BOX	A/E	1	95239-240-TOS	72001563
A340	FCC Label	RATING LBL	A/E	1	95238-504-TOS	72001564
Y121	Warranty	WARRANTY	A	1	95239-482-TOS	72001570
Y123	Notice	NOTICE	A/E/J	1	95238-518-TOS	72001572

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